

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Wadood HAMAD et al

Examiner: L. Ferguson

Serial No: 09/522,359

Group Art Unit: 1774

Filed : March 9, 2000

For : ENGINEERED CRACK RESISTANT  
PAPER AND BOARD

APPLICANT'S APPEAL BRIEF  
UNDER 35 U.S.C. §1.192

Commissioner of Patents and Trademarks  
Washington, DC 20231

Sir:

(1) REAL PARTY IN INTEREST

International Paper, the assignee of the application  
is the real party in interest.

(2) RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences.

(3) STATUS OF CLAIMS

Claims 1-8 are pending and stand rejected.

(4) STATUS OF AMENDMENTS

No Amendments have been filed subsequent to the Final  
Rejection. A Request for Reconsideration was filed on  
November 14, 2002. An Advisory was mailed November 26, 2002.

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(5) SUMMARY OF INVENTION

The invention is a cellulose fiber network having  
polymer impregnated into the network in geometric formations.  
The geometric formations form a discontinuous polymer layer when

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absorbed through the thickness of the sheet. The discontinuous polymer layer acts as stress arresters, or locations of crack retardation, to improve the energy absorbing capacity of the treated sheet. The geometric formations may be in such forms as circles. The effect is an overall increase in fracture toughness as summarized in Table I on page 5, and Table II on page 6.

#### (6) ISSUES

1. Are claims 1 and 3-8 obvious over U.S. Patent 5,876,792 (Caldwell) in view of U.S. Patent 5,620,819 (Conforti et al) and U.S. Patent 5,061,545 (Li et al).

2. Are claims 1 and 2 unpatentable over U.S. Patent 4,520,062 (Ungar et al) in view of U.S. Patent 5,620,819 (Conforti et al) and U.S. Patent 5,061,545 (Li et al).

#### (7) GROUPING OF CLAIMS

Claims 1-8 stand or fall together.

#### (8) ARGUMENTS

The Examiner rejects claims 1 and 3-8 as being unpatentable over Caldwell in view of Conforti et al and Li et al. The Examiner relies upon Caldwell for disclosing a polymer composition applied onto the surface of the web. The polymer may be in an acrylic polymer. The Examiner states that Caldwell does not disclose the use of particular polymers to be used in the instant invention and relies upon Conforti to disclose the particular polymers recited in the claims. The Examiner also states that Caldwell does not disclose the use of a discontinuous polymer matrix and relies upon Li to disclose a fibrous web with a discontinuous polymer distribution.

The Examiner states that Caldwell discloses a process applicable to sheets of paper, and refers to column 5, lines 44-49. The patent states that a web of fabric that is too weak or

elastomeric may be laminated to a support backing of paper or film, such as MYLAR. Using a backing of paper or MYLAR is not the same as impregnating the paper itself with a polymer.

According to the disclosure of Caldwell, it is the fabric, not the paper, that is treated with polymer, as the paper only serves as a backing and the polymer is applied to the surface of the fabric. There is no disclosure or suggestion of a polymer impregnation. This is reinforced at Column 5, lines 14-18 where it is stated that the "webs, fibers and fabrics can be used to prepare a wide variety of products including, but not limited to carpets, specialized clothing, career apparel, bioengineered surfaces for diagnostic applications, and upholstery." The fact that the web discloses a fabric, not paper, is reinforced again at Column 5, lines 51-53 which states "a web treated by this invention can undergo a large number of machine washings with detergent without experiencing appreciable or significant change or deterioration."

The Examiner relies upon Li et al for the disclosure of a discontinuous polymer matrix. The Examiner cites column 9, line 35 to support the position that Li et al discloses such a feature. Li et al discloses a non-uniform continuous distribution of a matrix, not a discontinuous distribution. Column 9, line 35 discloses that the non-uniform distribution of the matrix composition may be obtained by laminating a fibrous web with a continuous layer of polymeric composition and an additional layer having a discontinuous polymer distribution. The resulting web has a continuous, non-uniform distribution of polymer. Moreover, there is no disclosure or suggestion that the polymer is formed in geometrical formations, as is claimed. The Examiner stated that Caldwell disclosed fibers constituting geometrical formations in diamond-shape form there is no mention of the polymer.

Claims 1 and 2 were rejected as being obvious over Ungar et al in view of Conforti et al and Li et al. Ungar et al discloses an abrasion resistant coating present as a distinct layer in a laminate. There is no disclosure nor suggestion to apply this layer as an impregnation of a web. An abrasion

coating better protects a web when it is situated on the surface of the web than impregnated into the web. The distinct layer provides a barrier to abrasion damage. The polymer of the invention impregnated into the web, does not provide abrasion resistance, but serves as a crack retardation and fracture impedance.

As stated previously with respect to the rejection based on Caldwell, the references to Conforti et al and Li et al do not cure the deficiencies in Ungar et al, as no reference discloses an impregnated, discontinuous polymer matrix in geometric formations.


Furthermore, to apply an abrasion resistant layer, as is disclosed by Caldwell and Ungar et al, in a discontinuous manner would render it useless. The Examiner found this argument to be non-persuasive because applicant provided no support for this argument.

The argument is based on the reasoning that having a discontinuous abrasion resistant layer in a discontinuous manner would allow the untreated areas to be subject to wear and defeat the purpose of having an abrasion resistant layer. The argument is analogous to providing a metal part with discontinuous rust protection. The unprotected area would be allowed to rust and entirely defeat the purpose of providing a protective layer.

#### CONCLUSION

The claims are allowable over the prior art. It is respectfully requested that the Examiner's rejection be overturned and the application allowed.

Respectfully submitted,

  
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February 12, 2003  
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Attorney's Docket: A-6756.AB/cat

## A P P E N D I X

### WHAT IS CLAIMED IS:

1. A crack-resistant paper or board comprising a cellulose fiber network web; and a thin discontinuous polymer material impregnated into the web in geometrical formations.

2. The crack-resistant paper or board as claimed in claim 1, wherein the thin discontinuous polymer material is a thermoplastic or thermoset material.

3. The crack-resistant paper or board as claimed in claim 1, wherein the geometrical formations are thin rectangular stripes, equi-distant circles or diamond-shape formations.

4. The crack-resistant paper or board as claimed in claim 1, wherein the polymer is approximately 5%-20% of a basis weight of the paper or board.

5. The crack-resistant paper or board as claimed in claim 1, wherein the polymer is selected from the group consisting of poly-butadiene, acrylonitrile-butadiene, ethylene vinyl acetate-butadiene and styrene-butadiene.

6. The crack-resistant paper or board as claimed in claim 1, wherein the polymer is selected from the group consisting of a latex blend, an acrylic polymer, a polyester resin and a liquid crystalline polymer.

7. The crack-resistant paper or board as claimed in claim 1, wherein the polymer is a copolymer selected from the group consisting of polyhydroxybutyrate-butanoate and a cellulose acetate butyrate.

✓ 8. The crack-resistant paper or board as claimed in claim 1, wherein the paper or board has a polymer material coated on a surface of the paper or board.